

Docket No. 740756-2657  
Application No. 10/699,668  
Page 8

#### REMARKS

By way of the present response, claims 1, 4, 7, 10, 17 and 20 are amended, claims 31-33 are canceled without prejudice or disclaimer, and new claims 34-36 are added. Support for the amendments is found, for example, at page 12, lines 11-16 of the specification. Upon entry of the amendment, claims 1-30 and 34-36 shall be pending. In view of the above amendments and the following remarks, Applicant respectfully requests reconsideration and withdrawal of the rejections of the claims.

In section 2 of the Office Action, the Examiner states that the information submitted with the PTO Form-1449 on October 19, 2005, fails to comply with 37 C.F.R. §§ 1.97, 1.98 and the guidelines of MPEP § 609 because the reference includes a "hand written foot note on the side, thus it is not proper." However, it should be clear that the markings in the margin of the page submitted for consideration by the Examiner denote the source of the page, which corresponds to the information provided on the PTO Form-1449. Moreover, there is nothing in 37 C.F.R. §§ 1.97, 1.98 that would preclude any such markings, as long as the copy is legible. Furthermore, the document provided and listing thereof on the PTO Form-1449 were submitted as part of Applicant's reply to an Office Action, which does not require Applicant to satisfy the requirements of 37 C.F.R. §§ 1.97, 1.98 to have the Examiner consider the information relied upon by Applicant. As instructed in MPEP § 609.05(c), "Occasionally, documents are submitted and relied on by an applicant when replying to an Office action. These documents may be relied on by an applicant, for example, to show that an element recited in the claim is operative or that a term used in the claim has a recognized meaning in the art. Documents may be in any form but are typically in the form of an affidavit, declaration, patent, or printed publication ... The record should reflect whether the evidence was considered, but listing on a form (e.g., PTO-892, PTO-1449, or PTO/SB/08A and 08B) and appropriate marking of the form by the examiner is not required." Attached herewith is a copy of the previously submitted page with the markings removed. While the Examiner is not required to do so, Applicant requests the Examiner to indicate consideration of the document by initialing the document listing on the PTO Form-1449, and to return a copy of the initialed form in the next communication to Applicant.

Next, in section 3 of the Action, the Examiner objects to claims 31-33 for containing informalities. As indicated above, claims 31-33 are canceled without prejudice or disclaimer,

W717853.1

Docket No. 740756-2657  
Application No. 10/699,668  
Page 9

thus rendering this objection moot.

Starting on Page 3 of the Action, the Examiner maintained the rejection of claims 1-5, 7-11 and 13-16, and rejected new claims 31 and 32 under 35 U.S.C. § 102(b) as allegedly being anticipated by Yamazaki et al. (EP Patent No. 0 485 233, hereinafter “the ‘233 publication”); the rejection of claims 6 and 12 under 35 U.S.C. § 103 as allegedly being unpatentable over the ‘233 publication in view of Kim et al. (U.S. Patent No. 6,100,954); the rejection of claims 17-21, 23, 24-29, 30 and 33 under 35 U.S.C. § 103 as allegedly being unpatentable over the ‘233 publication in view of Yamazaki (JP 06-296023, hereinafter “the ‘023 publication”); and the rejection of claim 22 under 35 U.S.C. § 103 as allegedly being unpatentable over the ‘233 publication in view of the ‘023 publication and Kim et al. Insofar that the Office may consider these rejections to apply to the amended claims, Applicant respectfully traverses.

Initially, Applicants note that the cancellation of claims 31-33 render the rejections of these claims moot.

With respect to pending independent claims 1, 7 and 17, it is respectfully submitted that none of the 233 publication, the Kim et al. patent and the ‘023 publication, whether considered individually or in combination, teach or suggest the claimed features of “concentration of boron in an interface between said first insulating film and said second insulating film is higher than concentration of boron in an interface between said second insulating film and said channel region,” as set forth in each of the amended independent claims. Although the ‘233 publication discloses a SiO<sub>2</sub> layer 32a doped with a phosphorus element or a halogen element, and a non-doped SiO<sub>2</sub> layer 32b formed on the layer 32a as shown in Figure 11(A) and described at page 11, lines 36-37, the ‘233 publication does not mention or suggest concentration of boron at interfaces, as claimed.

Furthermore, an embodiment of the present invention discloses that both reliability of TFTs and threshold voltage variations of TFTs can be improved by successively forming a second insulating film and a semiconductor film after a first insulating film has been heat-treated in the atmosphere, as shown at page 9, lines 2-26, page 11, lines 22-28 and page 18, line 29 to page 19, line 27 of the specification, for example. Accordingly, the first insulating film of the present invention, which is heat-treated in the atmosphere and has boron element, is different from the SiO<sub>2</sub> layer 32a of the ‘233 publication, which is intentionally doped with

W717853.1

Docket No. 740756-2657  
Application No. 10/699,668  
Page 10

*phosphorus or a halogen element* in order to neutralize alkali ions that have diffused from the substrate into this film.

It is to be noted that the Examiner continues to consider an "interface state density" value the be the same as an impurity concentration value. However, as Applicant pointed out in the previous response, the Office's reliance of "E11 atom-cm<sup>-3</sup>" (see the Office Action, page 4, lines 2 and 15, and page 7, line 6) is not accurate. In fact, the term "E11 atom-cm<sup>-3</sup>" (emphasis added) does not appear in the '233 publication. Rather, page 10, lines 31-34 states, "The intermediate region 28 of the silicon semiconductor film 33 between the impurity regions 34 and 34' is defined as a channel region as illustrated in Fig. 10(D) and the resultant interface state density is not more than  $2 \times 10^{11} \text{ cm}^{-3}$ " (emphasis added) (also see, page 6, line 34). As pointed out by Applicant on pages 8 to 9 of the response dated October 19, 2005, an interface state density does not mean an impurity concentration, and thus does not necessarily imply an impurity concentration in an interface between the second insulating film 32b and channel region 28 shown in Figure 11(A) of the '233 publication. It is to be noted that on page 12, lines 1-2 of the Office Action, the Examiner fails to appreciate Applicant's explanation regarding density of states, and how the term "interface state density" as described in the '233 publication relates thereto.

In response to Applicant's assertion that the arguments presented in the June 9, 2005, response should have been addressed in the Acton dated July 19, 2005, in first three paragraphs of page 11 the Examiner asserts that the arguments are moot because Applicant broadened the claim and caused the Examiner to use the same reference in a rejection under Section 102 instead of under Section 103. It appears the Examiner believes *per se* rule exists allowing the Examiner to overlook arguments if the type of rejection changes. It is respectfully submitted, however, that no such rule exists, and that Applicant's arguments were relevant to the Examiner's rejections.

Finally, the Examiner asserts that Applicant "should have reviewed the teaching as shown in Fig. 11A" and that the '233 publication teaches that the first insulating film 32a is doped with phosphorus, halogen or oxygen, while the second insulating film 32b is undoped, and that one of ordinary skill in the art would have concluded that the interface between the films 32a and 32b would have a higher concentration of impurity (i.e., phosphorus, halogen or oxygen) concentration than that of the interface between the insulating film 32b and the

W717853.1

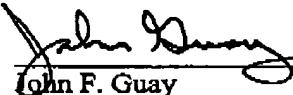
Docket No. 740756-2657  
Application No. 10/699,668  
Page 11

channel region (see, page 11, the last three paragraphs). However, as Applicant has repeatedly pointed out, the '233 publication does not mention or imply any particular impurity concentration at the interface. Moreover, the '233 publication fails to teach or suggest the claimed features of "concentration of boron . . .," as presently claimed.

The remaining rejected claims 2-6, 8-16, 18-30, and new claims 34-36, depend from one of independent claims 1, 7 and 17, and therefore are allowable at least for the reasons pointed out above, and further for the additional features recited. Furthermore, new claims 34-36 each recite a specific maximum concentration of boron, which in the context of the other recited features, is not taught or suggested by the '233 publication, the '023 publication and the Kim patent.

It is respectfully submitted that the present application is in condition for allowance, and prompt notification of the same is earnestly sought.

Respectfully submitted,



John F. Guay  
Registration No. 47,248

NIXON PEABODY LLP  
Suite 900, 401 9<sup>th</sup> Street, N.W.  
Washington, D.C. 20004-2128  
(202) 585-8000

W717853.1